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ABSTRACT

Computer conferencing is a promising technology for use in adult education because it eliminates time and geography as barriers to learning for adults. A growing body of evidence indicates that the technology is a suitable means for delivering instruction, although a number of questions remain as to the optimum circumstances for its use. For example, use of computer conferencing has institutional repercussions, such as mere inertia, policy issues, financial issues, cost-benefit ratios, and governmental regulations. Faculty, students, and support staff involved with the technology are also affected. Faculty must alter teaching approaches and reconsider student learning. Students must accommodate themselves to the new format and face the demands of investment in hardware and software. Selection of computer conferencing also raises questions related to instructional design. Points for consideration include the fundamentally asynchronous communication of computer conferencing and the nature of computer screens. The introduction of computer conferencing for instructional purposes places new demands on faculty who need to be conversant with the fundamentals of the computer operating system, learn to use the software, and prepare instruction consistent with its characteristics. Research is needed in the areas of the institution, participants, teaching and learning, and the process. (YLB)

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Technical Report Series

COMPUTER CONFERENCING: A TECHNOLOGY FOR ADULT EDUCATION

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This Technical Report Series is dedicated to disseminating knowledge regarding these innovations, with the hope that sharing such information will improve the practice of adult education.

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ABSTRACT

Many adult learners are constrained in their studies by family and work obligations or face other restrictions that make it difficult to attend classes in traditional settings. Computer conferencing is a promising technology for use in adult education because it eliminates time and geography as barriers to learning. A growing body of evidence indicates that the technology is a suitable means for delivering instruction, although a number of questions remain as to the optimum circumstances for its use. The purpose of this Technical Report is to provide a signpost for adult educators to the world of computer conferencing. Following a brief introduction to computer conferencing, this report discusses pertinent issues and suggests areas where research is needed to help realize the potential of computer conferencing in adult education and learning. The report concludes with a Glossary and a list of Suggested Readings.

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Barbara Florini

COMPUTER CONFERENCING: A TECHNOLOGY FOR ADULT EDUCATION

Barbara M. Florini

THE EMERGENCE OF COMPUTER CONFERENCING

Various forms of advanced communications technology provide educators with opportunities to reach new audiences and to reach old audiences in new ways. Of the newer technologies, computer conferencing is especially promising for use in adult education. This technology combines the convenience of mail with something approximating the communicative interaction of the telephone. The result is an enhanced form of communication. Like mail and the telephone, computer conferencing can reach learners in their homes, at their work sites, or during their travels. Consequently, people who are homebound, geographically isolated, or constrained by time-related factors can participate in educational opportunities in ways previously impossible.

Computer Conferencing: What Is It?

Computer conferencing is a computer-mediated form of telecommunications; that is, a computer plays an intermediary role in the process of your exchanging communications with those whom you cannot conveniently meet face-to-face. Conference participants need access to either of the following arrangements: (a) access to a microcomputer, a modem, telecommunications software, and a telephone outlet in order to communicate with a mainframe computer housing the conferencing software or, (b) access to a computer terminal connected to this mainframe. Computer conferencing is similar to e-mail, its electronic relative, in that messages sent to you can arrive virtually instantaneously but are stored by the computer until it is convenient for you to receive them. Similarly, you can send messages to others to read at their convenience. In other words, communication exchanges take place asynchronously (not at the same time). Neither sender nor receiver is bound by the time and place constraint imposed by the more synchronous telephone.

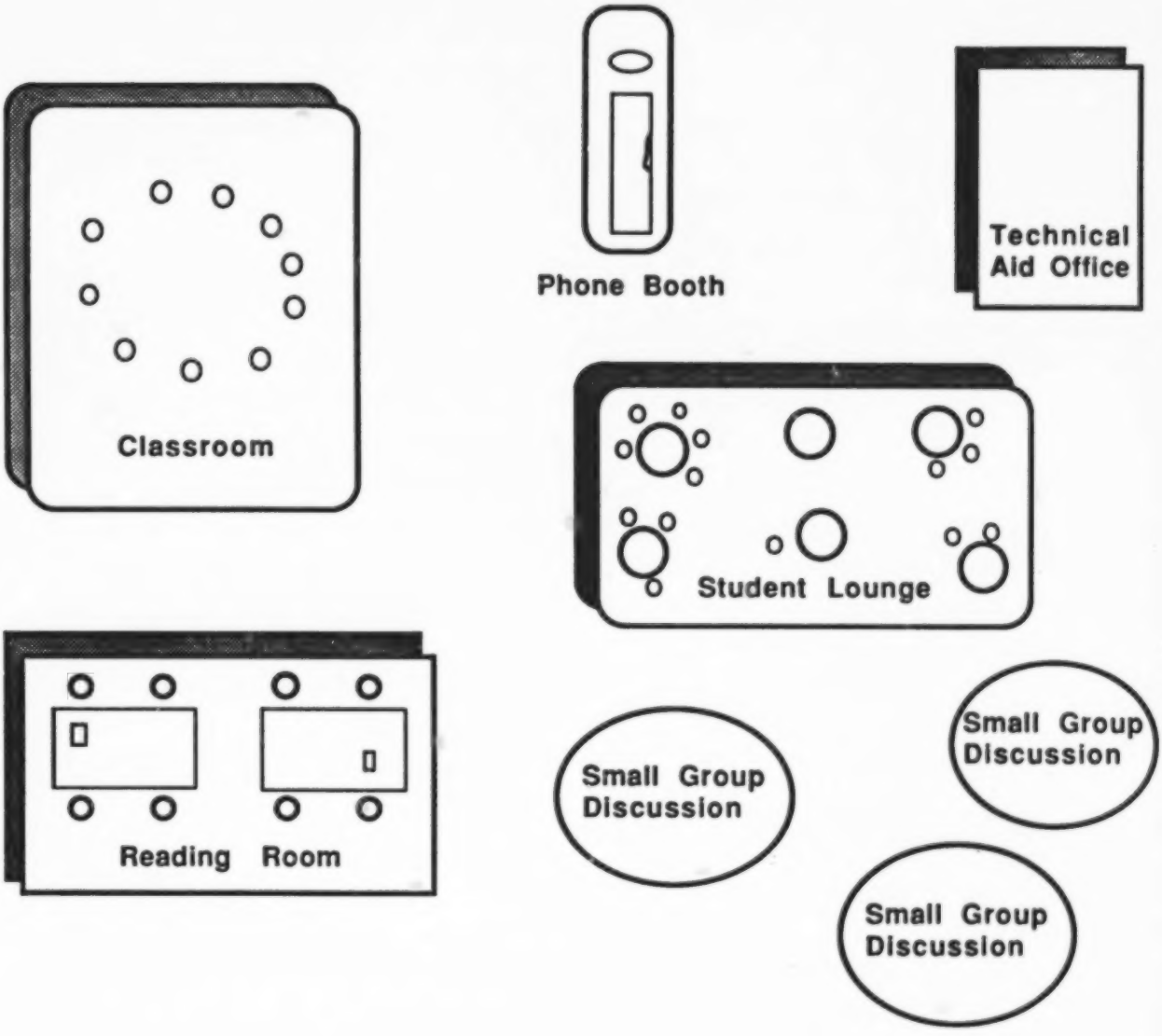
Like e-mail, computer conferencing software enables person-to-person communication. But its power lies in its ability to support group discussions. Groups can include all participants of a particular computer conference as well as subgroups

of the participants. Consider an adult education course in virtually any content area. The course title, for example "Community Development," would provide the name of the overall conference. Only students enrolled in the course would have access to the conference. Others would be unable to join the conference, read topics within it, or write to any of the topics.

The conference, "Community Development," might in turn consist of a series of topics as determined by the instructor. One topic might be called "Classroom" to which all students and the instructor would have read and write privileges. Another topic could be called "Library" or "Reading Room." This might consist of different readings assigned by the instructor. Students would probably be given only read privileges for this topic. A third topic might be "Student Lounge," which would be reserved for students to communicate among themselves. Throughout the course, the instructor could set up various discussion topics limited to small groups of students. These groups would function like any small discussion group, except the communication would take place asynchronously. Members of any one group might be participating from their homes or institutions in Syracuse, New Jersey, Canada, and Australia or any other place having the right combination of hardware, software, and computer network access. The number and characteristics of topics available in the conference "Community Development" would be restricted only by the needs and imagination of the instructor. Individual students and the Instructor can also have private communications through the conferencing software. Figure 1 illustrates a model for a formal course in a higher education setting.

The model shows how computer conferencing could be used for instructional purposes, but the software supports a variety of conference-type activities. Actually, conferencing options have been available for at least two decades. However, until the advent and spread of the microcomputer and the accompanying decline in computer costs, conferencing was not an especially attractive delivery system for widespread use in education. Now, microcomputers are becoming ubiquitous and easier to use; more people are becoming accustomed to using computer-mediated telecommunications; and computer conferencing software promises to improve in quality. These factors strongly suggest a growing role for computer conferencing in distance learning, and it becomes easier all the time to envision creating an electronic or virtual classroom that transcends time and place constraints. The following section provides evidence for this statement.

CONCEPTUAL MODEL FOR A COMPUTER CONFERENCING COURSE



The Case for Computer Conferencing in Adult Education

Although computer conferencing is neither a panacea nor without limitations, the general efficacy of computer conferencing for instructional purposes has been documented. For several years, investigators in various institutions have been exploring the technology for use in delivering instruction. Their efforts, which generally focused on issues of teaching and learning, have resulted in valuable guidelines or

heuristics. Several avenues for research have also been identified. Collectively the efforts of the early investigators show a variety of settings in which computer conferencing has been successfully used for instructional purposes.

Feenberg (1987), for example, writes from the perspective of his experiences as a humanities teacher in conducting several seminars via computer conferencing. He refers to the use of the technology as a "truly appropriate application of computers to humanities education" (p. 169). Mason (1988) also identifies the humanities as an important area for the use of computer conferencing.

Harasim (1987) describes the successful use of computer conferencing in graduate level courses and reports the results of her exploratory research. Basically, she concludes that computer conferencing is an effective instructional delivery system. Harasim further suggests that computer conferencing has "the potential to offer both quantitatively and qualitatively different and in many cases better learning experiences than that of the classroom" (p. 133).

The work of McCreary and Van Duren (1987) provides additional support for the use of computer conferencing to deliver instruction. They also point out the need to (a) train students to use the equipment and software prior to beginning instruction, (b) provide for help throughout the instruction, (c) have distance students make computer contact with the instructor before enrolling in the class, and (d) provide for instructors' training prior to their teaching via computer conferencing.

Mason (1988), who also indicates the importance of preconferencing training, further supports the use of computer conferencing in distance education. She describes the value the technology adds to instructional environments by providing distance education students with faster feedback and interaction with peers. A project evaluation report by Hiltz (1988a) additionally documents that computer conferencing is an effective instructional delivery system. Although some students commented negatively on the experience, the overall indicators were positive. Clearly, the efficacy of computer conferencing for delivering instruction is supported by its use in numerous instances. The factors discussed above influenced the decision to investigate computer conferencing further within the context of the Kellogg Project.

THE KELLOGG PROJECT AND COMPUTER CONFERENCING

The Kellogg Project has provided a welcome opportunity to investigate the use of advanced communication technologies in relation to the Adult Education Program at Syracuse University. One outcome of the Project is to be the development of a

master's-level degree program of value to and attraction for adult learners in rural North American and international settings. The mechanisms for delivering such a program are critical to its success. Much is already known about the strengths and weaknesses of the more traditional ways for delivering educational programs at a distance--mailed print and tape material, use of the telephone, and face-to-face tutorials at designated sites. In keeping with the advanced-technology orientation of the Kellogg Project, it is appropriate that we turn our attention to newer technologies.

Upon due deliberation, computer conferencing was selected as the first technology for exploration. Because conferencing breaks the constraints of time and place, it is especially well suited for use in adult education. The student population, most of whom study on a part-time basis, usually needs to integrate study with job and family obligations. Because courses delivered via conferencing are available 24 hours a day, seven days a week, and with increasingly minimal computer skill requirements, computer conferencing is indeed promising for use in adult education. Conferencing promises another advantage for use in distance education: It allows a degree of interactivity between students and instructor and among students that should help ameliorate the loneliness of the long distance learner. Moreover, discussion of ideas will fuel much of the interactivity, thus providing students a more sustained level of intellectual stimulation than usually has been possible in distance education.

Following our decision to explore computer conferencing, the next choice was that of a suitable conferencing program. In consultation with representatives of the University's Academic Computing Services and with users of different computer conferencing software, we selected the program *Participate*, commonly referred to as *Parti*. Parti is a program of proven quality. It has been available for some time and is used in a variety of settings, including the Ontario Institute for the Study of Education at the University of Toronto. It is also a very user-friendly program. Its menus are easy to interpret; errors are simple to correct; the commands are in understandable English; and the exit procedure precludes a user getting "lost" in the program.

Subsequently, Parti was installed on the VAX computing system at the University. After several members of the Kellogg staff familiarized themselves with the program, representatives of the University's College of Law were assisted in their efforts to use Parti for various purposes. The Adult Education Program began its use of Parti on a limited, voluntary basis: Roger Hiemstra introduced it to students in "Methods and Techniques for Teaching Adults," and Barbara Florini used it in her new course, "Technological Perspectives and Adult Education." Extensive use of Parti has been incorporated in plans for future courses.

Evaluation and research have been an important component of the above activities. Some of the evaluation and research efforts relate directly to the instructional uses of computer conferencing within the Adult Education Program at Syracuse University. Other efforts focus on broader, but equally pertinent, issues like those discussed in the following sections.

INSTITUTIONAL AND ORGANIZATIONAL ISSUES

Once it has been demonstrated that a technology is suitable for use in delivering instruction, we are faced with issues regarding conditions for its most suitable use and ways of encouraging its use where appropriate. For example, use of computer conferencing has institutional repercussions, as well as effects on faculty, students, and support staff involved with the technology. Its selection for delivering instruction also raises questions related to instructional design. The purpose of the remainder of this report is to introduce both institutional and instructional design issues, as well as to raise some future research questions.

Implications for Institutions

Although institutional issues have received less apparent attention from researchers, both Bacsich (1985) and Bates (1985) have noted that institutional factors play a role in the adoption of new instructional delivery systems. Mere inertia comes readily to mind. The adoption of an effective and efficient system is delayed simply because no one has mustered the energy to attend to the adoption process. But inertia is just one of several factors. Use of a technology like computer conferencing raises questions of concern for administrators about policy, finances, state regulations, and resource allocation.

For instance, there are policy issues in traditional institutions of higher education related to awarding credit and/or degrees without imposing residential requirements. Financial issues include those of purchasing, installing, and maintaining the software, as well as expenses related to user and faculty support. For example, should faculty be equipped by the institution so they can work from home? There are also questions of cost-benefit ratios when technology is used to deliver instruction. Decision makers have to consider whether or not there is enough legitimate user demand to justify the costs related to the technology. A related institutional question is what to do about those students for whom the technology is not readily accessible whether due to costs

or other reasons. Other concerns involve governmental regulations. Even private institutions often have charters governing their operation from the states in which they are located. Someone needs to resolve questions like whether use of computer conferencing for delivering instruction is consistent with the charter and, if not, what steps must be taken to use the technology for instructional purposes. As indicated by the preceding, there is no question that the use of a technology like computer conferencing requires extra resources, whether in direct costs, use of personnel, or use of materials. If conferencing is to realize its potential, institutional issues must receive more attention than they have previously.

Implications for Instructors, Students, and Others

Instructors

Experience in working with advanced communications technologies strongly suggests that faculty will be surprised by the extent to which they will need to alter some of their accustomed approaches to teaching when using computer conferencing. Many will resist making changes or simply refuse to make them, with serious consequences for students, the institution, and the reputation of computer conferencing. Training workshops, along the lines suggested later in this report, are one way of avoiding unfortunate consequences.

In addition, faculty need to consider issues related to student learning. For instance, observation and experience in using advanced technology with students suggests that their energies initially will be focused almost exclusively on the *procedures* for using the technology. Instructors then need to take steps to ease students' first use of a technology like computer conferencing. The existing literature (Harasim, 1987; Hiltz, 1988b; Mason, 1988) suggests what an instructor might do. Following this advice will hasten the time when students are comfortable enough with the technology to turn their attention to the important intellectual issues of the course.

Students

Like faculty, students must also make accommodations when participating in computer conferencing. Personal behavior that proved adequate for traditional classrooms may not suffice in a conferencing class. Those accustomed to taking a back seat during large and small group discussions will find it impossible to hide their

lack of engagement. Glib, facile speakers will find that lack of substance in their communication is readily visible. Finally, the 24-hour 7-day-a-week availability of computer conferencing renders less credible excuses for late assignments.

Students also face the additional demands necessitated by using the technology. They may need to invest in the hardware and software that will enable them to participate in conferencing. Some will have to acquire basic computer and telecommunications skills. Others may need to learn the basics of a new operating system in addition to learning how to use the conferencing software itself. Many will have to extend their telecommunications skills to include uploading and downloading files in order to reduce telephone costs. The growing numbers of people engaging in computer conferencing indicates it is an accessible technology for many--accessible both in terms of learning to use it and in terms of acquiring the necessary hardware and software.

Others

Use of advanced communications technology usually necessitates involving people other than faculty and students. Computer conferencing, for instance, requires cooperation with an institution's computer service staff in acquiring, installing, and maintaining the computer conferencing software. Moreover, these are the people we turn to for help with our technical problems. The timeliness of their responses can influence the success of our efforts. It is important to note that the use of their time represents a resource expenditure by the computer service unit. Thus, the introduction of a technology like computer conferencing affects that unit's budget and ultimately that of the institution.

The successful incorporation of a sophisticated technology in a university environment depends upon attention to the various institutional or organizational issues highlighted in the preceding section. Lack of such attention can forestall introduction of the technology or inhibit the realization of its potential. However, although necessary, attention to these issues is not sufficient to ensure optimum use of the technology, especially for instructional purposes. The use of computer conferencing raises many questions related to instructional design as indicated in the next section.

IMPLICATIONS FOR DESIGNING INSTRUCTION

A basic tenet of the field of instructional development and design is that you select the delivery system that best allows you to reach your expressed goals and objectives within the context of the overall learning situation. By adhering to this tenet, we are less likely to try using computer conferencing under inappropriate circumstances. When it is an appropriate choice, instruction will have to be designed to maximize the strengths and minimize the weaknesses inherent in computer conferencing.

Experienced instructional designers have long recognized the need to adapt instruction in relation to the characteristics of the medium being used. A comprehensive discussion of design issues in relation to computer conferencing is both somewhat premature (much research remains to be done) and in any event beyond the scope of this report. The following merely serves to indicate some general issues of concern in designing the courses and in preparing faculty to teach them via computer conferencing.

Designing Curricular Materials

Although considerable research is needed on designing instruction for computer conferencing, people accustomed to designing effective instruction for delivery through different media can make some shrewd guesses about developing and designing high quality instruction for computer conferencing. The basic systems approach followed by many designers has repeatedly shown its robustness in numerous heterogeneous situations. Romiszowski (1981) provides a good introduction to instructional design.

In addition, the particular characteristics of computer conferencing suggest several points for consideration in designing instruction for this medium. For one thing, conferencing is fundamentally asynchronous communication. Students must be given time to respond. At the same time, instructors should set time limits for responses to keep the course moving along. Since many adult learners count on weekends for doing course work, instructors are well advised to use Mondays for deadlines with new work going to students on Tuesdays (L. Harasim, personal communication, June 21, 1988).

The nature of computer screens suggests additional considerations. The work of investigators who studied computer-aided instruction strongly implies a need to

consider both the density of the message on the computer screen as well as the overall message length when designing instruction. Communication is most effective when messages are (a) well laid out, and (b) confined to one or two screens at most.

This constraint to writing short messages is compatible with the essence of computer conferencing; that is, the medium facilitates group discussion. The effects of an overly verbose person in a face-to-face discussion have been widely experienced. Users of conferencing systems should be aware that lengthy messages have the same deadening consequences on electronically-mediated group discussions.

At times, there will be needs for longer materials. Instructors will want to provide students with readings or students will send papers to instructors. These items can be uploaded to a "library" area set aside within the overall conference space. Once there, materials can be download and printed for reading off-line. This practice can have the added advantage of minimizing telecommunications costs and easing problems like family disputes over availability of the telephone.

Training and Working with Faculty

The introduction of computer conferencing for instructional purposes places new demands on faculty who need to:

- be conversant with the fundamentals of the computer operating system on which the conferencing software is installed
- learn to use the software to set up and guide the course
- prepare instruction that is in keeping with the characteristics of computer conferencing.

Each of these points, which are addressed briefly in the next several paragraphs, suggest some focus for faculty training.

The Operating System

Computer conferencing programs normally reside on a mainframe computer system. Typically, users of the conferencing system need to log onto the mainframe in order to access the conferencing program. On exiting the conferencing software, users must also log off the mainframe. In addition, many conference users will want to upload and download files or change their log-in passwords. All these functions are governed by the operating system of the mainframe that houses the conferencing software. The particular procedures for executing these functions are easy to learn,

but they must be followed exactly as required by each operating system. It is essential that faculty training incorporate basic use of the mainframe housing the conferencing software.

The Software

In addition, faculty need to learn to use the conferencing program itself. This skill, which is fairly readily acquired, will enable faculty to establish and conduct courses as independently as they do their traditional courses. Ability to use the software will also provide faculty with important knowledge about its strengths and limitations.

The Instruction

To ensure the most successful outcomes, instruction for delivery via computer conferencing must be designed and managed in keeping with the characteristics of the conferencing program, some of which were discussed above under "Designing Curricular Materials." As noted previously, without proper training many faculty will resist making changes in the way they design and manage instruction. Yet the literature indicates that computer conferencing has particular characteristics calling for instructors to make accommodations (Feenberg, 1987; Foster, 1985; Hiltz, 1988b).

To help achieve this consistency in a timely manner, the services of an instructional developer experienced in designing courses for media delivery might be incorporated in faculty training. Because such developers usually have greater familiarity with technology in general than faculty have, their inclusion will speed the process of creating instruction for the conferencing system and facilitate the later process of managing the instruction. Developers are also accustomed to thinking in systems terms and are likely to anticipate and help forestall logistical problems related to conferencing. The inclusion of instructional developers in this stage of training can save valuable faculty time and avoid the high cost of experiential learning.

The above discussion provides some indication of the instructional design implications related to computer conferencing. As stated earlier, considerable research is still needed in this general area. The next section identifies several specific research needs.

RESEARCH NEEDS

The purpose of this section is to highlight needed areas of research related to the use of computer conferencing for instructional purposes. The intent is to suggest directions for research rather than to define a comprehensive research agenda. No particular theoretical paradigm is advocated for conducting research, but a greater contribution will likely be made by researchers who work within a clearly articulated theoretical framework. Such studies lend themselves more readily to meta-analysis, which ultimately results in more robust theory. In general, the section advocates approaching computer conferencing research from a systems perspective.

For example, research questions regarding issues of teaching and learning come readily to mind. But a broader arena of research comes to view by considering computer conferencing in a systems context and identifying questions related to the different system components. Thus, a larger system perspective from which to view computer conferencing includes elements such as the nature of the institution sponsoring the instruction, the conditions of instruction, the nature of the subject matter, the characteristics of the participants (students, faculty, others), the rules of communication, and the features of the software. Two useful research questions of a general nature would be, What kinds of relationships exist among these components? and, What is the significance of the relationships? The remainder of this section proffers the kinds of questions that might be investigated in relation to selected systems components. In some instances, questions overlap categories.

The Institution

As previously noted, institutional factors play a role in the adoption of new instructional delivery systems. Yet researchers have paid too little attention to organizational or institutional matters in relation to computer conferencing. A global question covering these concerns might be, Under what organizational conditions is the adoption of an advanced-technology delivery system facilitated or hindered?

The Participants

To facilitate faculty use of computer conferencing, it is worth asking, What techniques can be employed to support faculty in becoming effective instructors when

using computer conferencing? Also, What special skills and talents are needed to be successful as a conference leader? Some of the scholars cited earlier have suggested answers to this question, but additional research is needed where conferencing circumstances differ from those explored by previous researchers.

In relation to students we might ask, What techniques can be employed to support students in becoming effective learners when using computer conferencing? It would also be fruitful to enquire into the relationship between success in a course and (a) student facility in writing, (b) student adaptability when participating in computer conferencing, (c) student prior experience with computer-mediated telecommunication, and (d) student attitude toward computer conferencing. For both faculty and students it would be helpful to ask, What role does cultural background play in faculty and student use of computer conferencing? Harasim (1987) also asks whether there are some faculty or students for whom computer conferencing is simply not suitable. Another useful research avenue would be to investigate how we might best work with the technical experts we sometimes need. For example, we might ask, What must we know and do in order to work cooperatively with technical services people? We also need to follow up on the suggestion of McCreary & Van Duren (1987) that the "academic level, curriculum area, and relative status of conference participants" (p. 111), are important variables in relation to the use of computer conferencing.

Teaching and Learning

In this category, questions that need investigating include, What characterizes computer conferencing as an instructional delivery vehicle? Which teaching and learning theories seem most applicable given these characteristics.? Other relevant questions are raised by Harasim (1987) who concludes her article with the following research questions:

> What variables are critical (i.e., course design, teaching style, characteristics of the learner, class size, computer conferencing features, etc.) and how do these relate and impact upon the educational experience?...Is on-line learning in fact appropriate for all levels of education (schools, undergraduate education, continuing education)? Is it appropriate to all subject matter?" (p. 133-134)

Finally, we need to look at the use of conferencing as the sole means of delivering instruction and as one of several technologies employed in the same course.

The Process

Research is also needed related to (a) the nature of participation in a conference, (b) the need for rules of communication, and (c) the need for methods for procedures. To give just one example, What constitutes courtesy or etiquette in computer conferencing? This question goes beyond good manners. Perceptions of courtesy or lack of it bear significantly on the learning environment, affecting both students and teacher.

As the preceding paragraphs indicate, the area of computer conferencing provides considerable scope for conducting research. Many questions of both a micro and macro nature need to be answered or, equally important, raised. In addition to general issues related to the educational uses of computer conferencing, researchers in specific fields of study such as adult education can make a valuable contribution by exploring relationships between basic tenets of the field and computer conferencing.

CONCLUSIONS

Sufficient documentation exists to conclude that computer conferencing can be used successfully to deliver instruction. Satisfactory outcomes are dependent upon addressing such matters as institutional and organizational concerns and instructional design issues. As this report also indicates, there are many important remaining areas for research related to use of the technology. It is only natural that people directly involved with it should focus their research on human issues and on teaching and learning issues. It is equally important that organizational or institutional issues not be overlooked. If they are, we risk not being able to implement use of computer conferencing to the extent that we wish.

GLOSSARY OF TERMS

Asynchronous: Not going on at the same time. Used to describe e-mail and computer conferencing communications because messages are stored until it is convenient for the intended recipient to read them.

Communications technology: A general term embracing a set of technologies used in communication--radio, video, computer, and so on.

Computer conferencing: A computer-mediated form of telecommunication that especially facilitates asynchronous group discussion.

Conference: In the context of this report, *conference* refers to a general theme or subject or course title. A conference, in turn, may be further divided into TOPICS.

Distance education: Refers to educational contexts in which the instructor and students are separated geographically.

E-mail: The nickname for electronic mail, a computer-mediated form of telecommunications.

Electronic mail: A computer-mediated form of telecommunication that enables the asynchronous exchange of messages.

"Parti": The nickname for the computer conferencing program selected for use by the Kellogg Project at Syracuse University.

Participate: The name of the computer conferencing selected for use in relation to the Kellogg Project at Syracuse University.

Synchronous: Going on at the same time. In the context of this report, a telephone call could be considered as synchronous communication.

Telecommunications: As suggested by the root word, telecommunications are communications that take place over some distance--telephone, signal fires, radio, television, and so on.

Topic: Parti uses this term to describe subcategories within a conference.

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